What is Claimed Is:

1. A supported noble metal catalyst wherein the noble metal comprises nanometer-sized crystal particles contained on a support material within a matrix comprising a particle-to-support control and binding agent, said particles having a preponderance of (111) type of crystal phase on the face of the noble metal particles.

2. The catalyst of claim 1 wherein the support includes a porous support material.

3. The catalyst of claim 1 wherein the substrate is selected from the group consisting of activated carbon, carbon black, fluoridated carbon, alumina, bentonite, clays, diatomaceous earth, synthetic and natural zeolites, magnesia, titania, and polymeric materials.

4. The catalyst of claim 1 wherein the support material has surface area of at least 20 square meters per gram.

5. The catalyst of claim 1 wherein at least one-half of the crystal phases of the face of the noble metal particles comprise the (111) type of crystal phase.

6. The catalyst of claim 1 wherein the control and binding agent comprises a metallo-organic sequestering agent.

7. The catalyst of claim 6 wherein the sequestering agent comprises polyfunctional low molecular weight carboxylic acids and/or branched polyfunctional polymeric carboxylic acids.

8. The catalyst of claim 6 wherein the sequestering agent comprises glycolic acid.

9. The catalyst of claim 1 wherein the particle size of the nanometer-sized crystals is less than 5 nanometers.

10. The catalyst of claim 1 wherein the particle size is preferably less than 2 nanometers.

11. The catalyst of claim 1 wherein the noble metal is selected for the group consisting of platinum, palladium, rhenium, rhodium, ruthenium, osmium, and iridium.

12. The catalyst of claim 1 wherein the noble metal comprises 0.01% to 10% of the total catalyst weight.

13. The catalyst of claim 12 wherein the noble metal comprises 01 to 5 % of the total catalyst weight.

14. The catalyst of claim 1 wherein said particles further include metals other than noble metals including iron, nickel, copper and tin.

15. A method for preparing a supported noble metal catalyst having nanometer-sized crystal particles, said particles having a preponderance of (111) type of crystal phase on the face of the noble metal particles, comprising:

preparing a solution of a noble metal salt and a metallo-organic sequestering agent;

treating the solution of sequestered noble metal with a reducing agent;

impregnating a catalyst support with the reduced noble metal solution;

drying the impregnated support; and

activating the catalyst by reducing the dried impregnated support to yield the nanometer-sized noble metal catalyst having a preponderance of (111) type of crystal phase on the face of the noble metal particles.

16. The method of claim 15 wherein the solution is an aqueous solution of noble metal and the sequestering agent comprises glycolic acid with a ratio of metal to agent of between 1:0.5 and 1:10.

17. The method of claim 15 wherein the dried impregnated support is reduced by hydrogenation at a temperature between 100 and 400 degrees C.

18. The method of claim 15 wherein the supported activated catalyst has a noble metal loading of between 0.01 and 10 weight percent

19. The method of claim 15 wherein the support is selected from the group consisting of activated carbon, carbon black, fluoridated carbon, alumina, bentonite, clays, diatomaceous earth, synthetic and natural zeolites, magnesia, titania, and polymeric materials.

20. The method of claim 15 wherein the solution of sequestered noble metal is treated with a reducing agent comprising hydrogen gas.

21. The method of claim 15 wherein the solution comprising noble metal salt and a metallo-organic sequestering agent is treated with a reducing agent comprising hydrogen gas.

22. A method of reforming petroleum naphtha comprising:
treating the naphtha with the catalyst of claim 1 under reforming conditions.